

MASS. EA23.2: G94/add./993

V



312066 0270 8465 4

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER SUPPLY

**GUIDELINES AND POLICIES
FOR PUBLIC WATER SYSTEMS**

GOVERNMENT DOCUMENTS
COLLECTION

MAY 6 1994

University of Massachusetts
Depository Copy

November 1993 Addendum

GUIDELINES AND POLICIES FOR PUBLIC WATER SYSTEMS

1993 EDITION

TABLE OF CONTENTS

- GUIDELINES -

Definitions	2
Abbreviations	3
4.0 GROUNDWATER SUPPLY DEVELOPMENT AND THE SOURCE APPROVAL PROCESS	
Overview	3
4.1 Synopsis of Source Approval Process	4
4.2 Source Approval Components	5
4.2.1 Source Approval Process for Unconfined Wells	5
4.2.2 Source Approval Process for Confined Wells	7
4.2.3 Source Approval Process for Bedrock Wells	9
4.2.4 Source Approval Process for Springs as Public Water Supplies	10
4.3 Delineation of Aquifer Protection Zones I, II & III	15
4.4 Source Final Report	16
4.5 Approval Conditions	16
4.7 Conceptual Zone II for Existing Wells	17
4.10 General Well Construction	17
7.0 PUMPING FACILITIES	
7.6 Appurtenances	17
Appendix A - Interim Wellhead Protection Area Chart	
Appendix B - Generic Request for Proposals	
Appendix C - DWS Policies	

INTRODUCTION

The Massachusetts Department of Environmental Protection (DEP), Division of Water Supply (DWS) is pleased to make available these Guidelines and Policies for Public Water Systems.

This document is intended to provide guidance to the public, public water suppliers and their employees, and DEP staff concerning aspects of water supply programs regulated by DEP.

This 1993 Addendum includes all guidelines and policies generated by the DWS since the last release of this document in October, 1991. Portions of this document will continue to be revised every two or three years either as an addendum reflecting only changes since the last edition or as a complete document. These policies have been drafted to clarify interpretations of the Drinking Water Regulations 310 CMR 22.00, establish protocols for addressing site specific problems encountered in the field and establish the regulatory framework necessary to maintain or improve the public health and welfare.

The Massachusetts DEP includes four regions and regional offices and a main office in Boston. The regional offices are located in Springfield (Western Regional Office-WRO), Worcester (Central Regional Office-CRO), Woburn (Northeast Regional Office-NERO), and Lakeville (Southeast Regional Office-SERO).

The general telephone numbers for the Division of Water Supply Regional Offices are:

BOSTON	(617) 292-5770
WRO	(413) 784-1100
CRO	(508) 792-7650
NERO	(617) 935-2160
SERO	(508) 946-2700

This document is intended as an addendum to the October 1991 edition of the Guidelines and therefore only includes those sections that have been modified in some manner. The majority of the changes are in the Source Approval Process. Appendix A is the Interim Wellhead Protection Area graph utilized to determine the protective radius around public water supply wells yielding less than 100,000 gallons per day. Appendix B is a generic RFP prepared by the DWS to assist water purveyors in adhering to regulations and guidelines when delineating Zone IIs for existing sources. Appendix C includes copies of all DWS policies generated since the last release of the Guidelines that have not been incorporated into the text of this addendum.

Should questions arise during your use of this document, please contact either the Boston Office or the regional office which has jurisdiction over your community.

THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY

REPORT OF THE
COMMISSIONER OF THE
BUREAU OF CHEMISTRY
FOR THE YEAR 1907
CONTAINING
A SUMMARY OF THE
WORK OF THE BUREAU
DURING THE YEAR
AND A LIST OF THE
PUBLICATIONS OF THE
BUREAU

CHICAGO
PUBLISHED BY THE
UNIVERSITY OF CHICAGO PRESS
1908

THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY

REPORT OF THE
COMMISSIONER OF THE
BUREAU OF CHEMISTRY
FOR THE YEAR 1907
CONTAINING
A SUMMARY OF THE
WORK OF THE BUREAU
DURING THE YEAR
AND A LIST OF THE
PUBLICATIONS OF THE
BUREAU

CHICAGO
PUBLISHED BY THE
UNIVERSITY OF CHICAGO PRESS
1908

November 1993 Guideline Changes

The following are proposed changes to the Guidelines and Policies for Public Water Systems. This document is intended as an addendum to the October 1991 edition and should be used in conjunction with that document.

DEFINITIONS

To the Definition section the following should be added:

Approved Yield - The maximum volume of water that DEP approves to be pumped from a groundwater source in any 24 hour period. The approved yield may be pumped from the source in less than 24 hours if the well's safe yield criteria are met and the supplier receives special permission from DEP. The approved yield may never exceed the safe yield.

Interim Wellhead Protection Area (IWPA) - For public supply wells or wellfields that lack Department approved Zone IIs, the Department will apply an interim area of special protection. This interim area of special protection shall be a one-half mile radius measured from the well or wellfield for sources whose approved rate is 100,000 gpd or greater. For wells that pump less than 100,000 gpd, the IWPA radius is proportional to the well's approved yield which may be calculated according to the following equation: IWPA radius in feet = $(32 \times \text{pumping rate in gallons per minute}) + 400$. This equation is equivalent to the graph in Appendix A.

Pump Capacity - The peak of a pump's rating curve in gpm should not exceed the approved yield of a well expressed in gpm (approved yield / 1440 min/day) unless special permission is received from DEP.

Well Safe Yield - The safe yield is the volume of water the well is capable of yielding without using all available water and exposing the well screen. The safe yield must always be equal to or higher than the approved yield.

Spring - A spring is a natural discharge point where groundwater issues from soil or rocks in concentrated flow. Sources are not considered springs if mechanical methods are used to induce water and the collection system must not hydraulically affect the water table. Public water supply springs will be perennial springs of nonthermal origin.

Zone I - Zone I means the protective radius required around a public water supply well or wellfield. For public supply wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Tubular wellfields require a 250 foot protective radius. Protective radii for all other public water supply wells is determined by the following equation: Zone I radius in feet = $(150 \times \log \text{ of pumping rate in gpd}) - 350$. This equation is equivalent to the graph in Appendix D of the Guidelines and Policies for Public Water Systems, revised October 1991.

Zone A - The area within four hundred (400) feet laterally from the bank of a Class A surface drinking water source (as identified in 314 CMR 4.00) and its tributaries.

Zone B - An area either one-half (1/2) mile from the bank of a Class A surface drinking water source, or to the watershed boundary, whichever is less.

Groundwater - All water that occurs beneath the land surface in soils or geologic formations, specifically that part of the subsurface water in the saturated zone.

Saturated Zone - A zone in which all voids, large and small, are filled with water under pressure equal to or greater than atmospheric.

Watershed - The area contained within geomorphic or topographic boundaries of higher elevation that cause surface water and groundwater to drain or flow to lower elevations.

ABBREVIATIONS

To the Abbreviation section the following should be added:

fps - feet per second

MPA - Microscopic Particulate Analysis

SDWA - Safe Drinking Water Act

SWTR - Surface Water Treatment Rule

4.0 Groundwater Supply Development and the Source Approval Process

Overview (after the last paragraph of the section add)

Permits

Any individual, company, municipality or district intending to develop a public source of water supply serving 15 service connections or 25 individuals at least 60 days per year or intending to delineate a Zone II for a public supply well must apply for a permit.

To apply for any permit covered by 310 CMR 4.00, DEP's Timely Action and Fee Provisions, an applicant must complete, sign and submit:

- A.) a DEP Transmittal Form for Permit Application and Payment, and
- B.) a DEP application form for the appropriate permit category

Although municipalities are exempt from paying fees, they must still submit a transmittal form and the appropriate permit application with each submittal.

Additional information and copies of the appropriate forms may be obtained from the DEP Information Service at (617) 338-2255.

4.1 Synopsis of Source Approval Process (add)

Step IV.9 Add "if planned yield is 100,000 gpd and greater"

Step XIV Surface Water Treatment Rule

The Surface Water Treatment Rule (SWTR), an amendment to the Safe Drinking Water Act (SDWA), requires the Massachusetts DEP to notify the U.S. Environmental Protection Agency (EPA) of groundwater sources determined to be under the direct influence of surface water and at risk to waterborne diseases such as giardiasis. Water suppliers developing groundwater sources must demonstrate compliance with the SWTR by either the receipt of a DEP SWTR Exemption, the institution of appropriate wellhead/watershed protection or the installation of adequate filtration. DEP Exemptions are granted based upon well siting, well construction or the results of Microscopic Particulate Analysis (MPA).

Sand and Gravel Wells

New public supply wells that meet one of the following criteria will be granted DEP SWTR Exemptions.

1.) Groundwater sources located 150 feet or more horizontally from a surface water feature are exempt from MPA sampling. "Surface water feature" is defined as an area continuously inundated with flowing or standing water. Wetlands or low lying areas that are only periodically flooded are not considered surface water features.

2.) Groundwater wells constructed with a sanitary seal and the screens of which are separated from surface water features by a confining layer. "Confining layer" is defined as a continuous areally extensive geologic unit of low permeability.

3.) A groundwater source that cannot meet either of the exemption criteria listed above must meet all of the following to be exempt from MPA testing.

- a.) The top of the well screen must be 50 feet or more below the ground surface,
- b.) the well must be approved by DEP to pump 720,000 gpd on average or less
- c.) the well must have a properly installed sanitary seal, and

d.) the well must not have any total or fecal coliform violations during the first three years of operation. Testing will be conducted twice annually (spring and fall) for bacteria. If there are no total or fecal coliform present over the three year period, the source will be considered to have met the exemption criteria and will not be required to conduct MPA testing or install filtration.

If a groundwater source cannot meet any of the above criteria, MPA testing must be conducted in the spring and fall of the first year the source is on line. Testing will be conducted between April 1 and May 30 and again between August 15 and October 15. The initial MPA testing round may occur either in the spring or fall, whichever time period occurs first after the well has been on line for at least six months.

MPA results will be reviewed by DWS and a determination will be made whether the source warrants a DEP exemption, requires additional MEPA testing, or requires filtration.

Bedrock Wells

Wells constructed in bedrock must be approved to pump 100,000 gpd or less and meets all the following criteria to be considered for an exemption:

- 1.) the well must be 50 feet or more in depth;
- 2.) the well must have a surface seal, and
- 3.) the well must be 200 feet or more from a surface water feature.

If all of the criteria are met, the water supplier will be required to test the source monthly for total coliform bacteria to remain in compliance with the SWTR. Bedrock sources that fail to meet the above criteria must conduct MPA testing in the spring and fall in accordance with the schedule listed above for sand and gravel sources.

4.2 Source Approval Components

4.2.1 Source Approval Process For Unconfined Aquifer Wells

(IV.B.3) add: Ambient Well - water level readings should commence 5 days prior to startup of the pumping test.

(IV.G) add: Precipitation measurements should commence 5 days prior to startup of the pumping test.

(IV.I) Water Quality and Testing replace with:

Samples should be collected as close to the pump as feasible to minimize possible pipe contamination of the sample.

Exploratory Phase

During the exploratory phase (2 1/2 inch well) pumping test, the following parameters should be tested for:

1. Field tests - beginning and end of pumping test (see below)
2. Lab tests - the volatile organic chemicals listed in Appendix B (October 1991 Guidelines and Policies for Public Water Systems) and routine chemical analysis - end of pumping test

Prolonged Pumping Test

During the prolonged pumping test the following will apply:

1. Field tests - The consulting engineer shall be responsible for conducting on-site determinations for pH, odor, specific conductance, and temperature minimally at the beginning of the test, after 24 hours, and every two days thereafter until the end of the test.
2. Lab tests - The consultant supervising the prolonged pumping test shall be responsible for coordination of the sample analyses with a state certified laboratory. Under certain circumstances split samples or duplicates may be required by the department. The following samples must be collected utilizing appropriate sampling equipment and protocol, and delivered to the state certified laboratory.
 - a. Samples for total coliform bacteria shall be collected at the midpoint and end of test.
 - b. Samples for radionuclides (gross alpha, gross beta, and radon) shall be collected at end of test.
 - c. Samples for inorganic chemicals and all regulated and unregulated Volatile Organic Compounds required by 310 CMR 22.07 (Drinking Water Regulations) shall be sampled on the final day of the pumping test prior to shutdown.

d. Samples for regular chemical analysis shall be collected one (1) hour after commencement of the pumping test, every other day thereafter and on the final day of the pumping test prior to shutdown.

e. SOC Waiver - If the proponent of the source intends to apply for a Phase II SOC monitoring waiver, the following should be tested for prior to termination of the pumping test: alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, lindane, methoxychlor, simazine and a screen for PCBs.

f. Microscopic Particulate Analysis - Testing may be required if the source fails to meet the exemption criteria set forth in the Surface Water Treatment Rule.

g. Required analysis for contaminants not described herein shall be at the discretion of the DWS Regional Office and shall be based on site history, well type, regional water quality and geology/hydrogeology.

4.2.2 Source Approval Process For Confined Aquifer Wells

4.2.2.V.J.2 Water Quality and Testing replace with:

Samples should be collected as close to the pump as feasible to minimize possible pipe contamination of the sample.

Exploratory Phase

During the exploratory phase (2 1/2 inch well) pumping test the following parameters should be tested for:

1. Field tests - beginning and end of pumping test (see below)
2. Lab tests - the volatile organic chemicals listed in Appendix B (October 1991 Guidelines and Policies for Public Water Systems) and routine chemical analysis - end of pumping test

Prolonged Pumping Test

During the prolonged pumping test the following will apply:

1. Field tests - The consulting engineer shall be responsible for conducting on-site determinations for pH, odor, specific conductance, and temperature minimally at the beginning of the test, after 24 hours, and every two days thereafter until the end of the test.

2. Lab tests - The consultant supervising the prolonged pumping test shall be responsible for coordination of the sample analyses with a state certified laboratory. Under certain circumstances split samples or duplicates may be required by the department. The following samples must be collected utilizing appropriate sampling equipment and protocol, and delivered to the state certified laboratory.

a. Samples for total coliform bacteria shall be collected at the midpoint of the test, every 5 days thereafter and at the end of the test.

b. Samples for radionuclides (gross alpha, gross beta, and radon) shall be collected at the end of the test.

c. Samples for inorganic chemicals and all regulated and unregulated Volatile Organic Compounds required by 310 CMR 22.07 (Drinking Water Regulations) shall be sampled on the final day of the pumping test prior to shutdown.

d. Samples for regular chemical analysis shall be collected one (1) hour after commencement of the pumping test, every other day thereafter and on the final day of the pumping test prior to shutdown.

e. SOC Waiver - If the proponent of the source intends to apply for a Phase II SOC monitoring waiver, the following should be tested for prior to termination of the pumping test: alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, lindane, methoxychlor, simazine and a screen for PCBs.

f. Microscopic Particulate Analysis - testing may be required if the source fails to meet the exemption criteria set forth in the Surface Water Treatment Rule.

g. Required analysis for contaminants not described herein shall be at the discretion of the DWS Regional Office and shall be based on site history, well type, regional water quality and geology/hydrogeology.

4.2.3 Source Approval Process For Bedrock Wells

4.2.3 VII.D.2 "intake of the" pump "if a submersible, or the top of the screen if a turbine"

4.2.3 VII.H Water Quality Sampling and Testing replace with:

Water Quality Testing

Samples should be collected as close to the pump as feasible to minimize possible pipe contamination of the sample.

Exploratory Phase

During the exploratory phase (2 1/2 inch well) pumping test the following parameters should be tested for:

1. Field tests - beginning and end of pumping test
2. Lab tests - the volatile organic chemicals listed in Appendix B (October 1991 Guidelines and Policies for Public Water Systems) and routine chemical analysis - end of pumping test

Prolonged Pumping Test

During the prolonged pumping test the following will apply:

1. Field tests - The consulting engineer shall be responsible for conducting on-site determinations for pH, odor, specific conductance, and temperature minimally at the beginning of the test, after 24 hours; and every two days thereafter until the end of the test.
2. Lab tests - The consultant supervising the prolonged pumping test shall be responsible for coordination of the sample analyses with a state certified laboratory. Under certain circumstances split samples or duplicates may be required by the department. The following samples must be collected utilizing appropriate sampling equipment and protocol, and delivered to the state certified laboratory.
 - a. Samples for total coliform bacteria shall be collected once every five days and the end of the test.
 - b. Samples for radionuclides (gross alpha, gross beta, and radon) shall be collected at the end of test.

c. Samples for inorganic chemicals and all regulated and unregulated Volatile Organic Compounds required by 310 CMR 22.07 (Drinking Water Regulations) shall be sampled on the final day of the pumping test prior to shutdown.

d. Samples for regular chemical analysis shall be collected one (1) hour after commencement of the pumping test, every other day thereafter and on the final day of the pumping test prior to shutdown.

e. SOC Waiver - If the proponent of the source intends to apply for a Phase II SOC monitoring waiver, the following should be tested for prior to termination of the pumping test: alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, lindane, methoxychlor, simazine and a screen for PCBs.

f. Microscopic Particulate Analysis - testing may be required if the source fails to meet exemption criteria set forth in the Surface Water Treatment Rule.

g. Required analysis for contaminants not described herein shall be at the discretion of the DWS Regional Office and shall be based on site history, well type, regional water quality and geology/hydrogeology.

4.2.3.X.11 change the first line to "Pumping equipment shall be selected with capacity no greater than the approved yield (in gallons per minute) unless special permission is received from DEP.

4.2.4 Source Approval Process for Springs as Public Water Supplies

(This section replaces 4.2.4 in the 1991 Guidelines, significant changes are highlighted)

This section provides guidance in determining the yield of springs and evaluating water quality as well as establishing a protective area (Zone I) around springs used as public water supplies.

A spring is a natural discharge point where groundwater issues from soil or rocks in concentrated flow. Public water supply springs will be perennial springs of nonthermal origin.

A source is not considered a spring if mechanical methods are used to induce water. The collection system must not hydraulically affect the water table.

I. Request for Site Exam and Yield Test Proposal

One report will be submitted for these two phases of the source approval process. The report shall include:

A. description of the spring (e.g., depression, contact, joint spring, etc.) and geologic/hydrologic features that presumably control spring yield

B. description of the regional geology

C. yield test proposal:

1. proposed method of measuring flow

2. proposed dates of high and low flow measurements

3. supporting data used to determine high and low flow dates

4. when available, historical high and low flows should be reported

D. preliminary discussion of proposed water collection system

E. site plan at 1:6000 scale or larger, including significant topographic features and land uses in estimated Zone I

F. location map at 1:25000 scale with land uses within 1/2 mile radius

G. listing of land uses within the estimated Zone I and 1/2 mile radius; and discussion of associated potential impacts on water quality and quantity

II. Yield Test Analysis and Final Report

A. Yield Test

1. Determination of High and Low Flow Yields

a. The yield of a spring shall be calculated for high and low flow conditions. During high flow conditions, yields shall be determined by measuring the discharge a minimum of once per day for a ten day period. The flow is then averaged for ten days.

The same procedure shall be used to determine the average flow during low flow conditions.

b. Precipitation and/or recharge events shall be recorded during yield tests.

c. Daily fluctuations of yield should be estimated.

d. All flow measurements shall be taken at or near the natural point of discharge, prior to inflow of additional sources, and not within the water bearing formation.

e. Under no circumstances shall mechanical methods be used to induce water from a spring.

2. Determination of Variability

The variability of a spring's discharge should be calculated over a minimum one year period. Variability is defined by Meinzer (1923) as "the ratio of discharge fluctuation to its average discharge within a given period of record." Thus:

$$V = 100 \frac{(a-b)}{c}$$

where: V = variability in percent

a = maximum flow

b = minimum flow

c = average flow

3. All flow measurements shall be taken at the natural point of discharge and not within the water bearing formation.

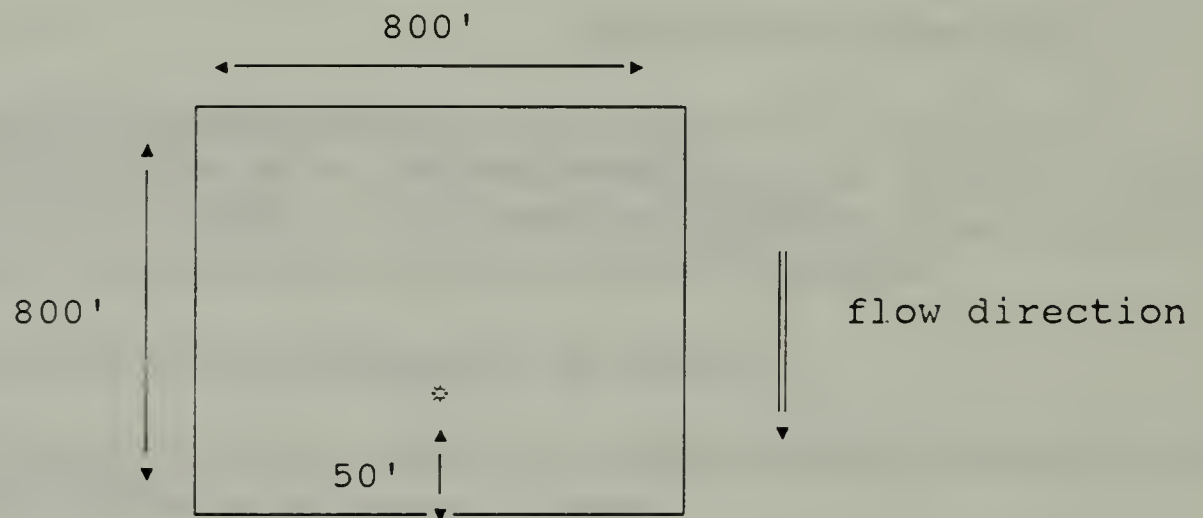
4. Under no circumstances shall mechanical methods be used to induce water from a spring.

B. Protective Area (Zone I)

1. Zone I

The protective area for springs will be a square with sides twice the radius required by the graph, "*Approved Daily Yield vs. Protective Radius*" (Appendix D of the Guidelines, revised October 1991) (i.e., flow rate = 100,000 gpd, Protective Radius = 400 feet; square = 800 feet on one side). The protective area shall be arranged such that the spring's outlet is 50 feet upgradient and centered in relation to the downgradient side of the square.

The maximum yield (highest historical or average high flow measured) shall be used to determine the size of the Zone I from the graph.



The requirement to own or control land within the Zone I is the same as for all groundwater sources (section 4.3.2 of 1991 Guidelines).

2. IWPA - The Interim Wellhead Protection Area for springs is the same as that for all groundwater sources (see Appendix A). DEP may require the institution of wellhead protection controls for springs yielding 100,000 gpd and greater for all or part of the IWPA.

C. Water Quality Testing

Water quality testing shall be conducted during the prolonged yield measurement test. All sampling and analyses shall be conducted using appropriate protocols. The schedule for water sampling must be approved by the DWS Regional Office.

The water supplier or its consultant shall contract a state certified laboratory to analyze the following parameters:

- a. Samples for total coliform bacteria shall be collected once every day during the test.
- b. Samples for radionuclides (gross alpha, gross beta, and radon) shall be collected at end of test.
- c. Samples for inorganic chemicals and all regulated and unregulated Volatile Organic Compounds required by 310 CMR 22.07 (Drinking Water Regulations) shall be sampled on the final day of test.
- d. Samples for regular chemical analysis shall be collected one (1) hour after commencement of the test, every other day thereafter and on the final day of the test.
- e. SOC Waiver - If the proponent of the source intends to apply for a Phase II SOC monitoring waiver, the following should be tested for prior to termination of the test: alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, lindane, methoxychlor, simazine and a screen for PCBs.
- f. Microscopic Particulate Analysis - testing may be required if the source fails to meet the groundwater under the exemption criteria set forth in the Surface Water Treatment Rule.
- g. Required analysis for contaminants not described herein shall be at the discretion of the DWS Regional Office and shall be based on site history, regional water quality and geology/hydrogeology.

If bacteria are present, a proposal addressing the type of treatment technique to be used shall be submitted to the DWS Regional Office.

D. Final Report

The final report shall include:

- 1. description of the spring and regional geology
- 2. description and discussion of yield, including:
 - a. maximum, minimum and average yields
 - b. variability of spring yield

- c. daily fluctuations of spring yield
- d. precipitation and/or recharge events during yield tests
- e. water needs, water use and storage required
- 3. discussion of water quality results and proper treatment technique if necessary
- 4. listing and discussion of land uses within the Zone I and presumed contributory area that potentially impact water quality or quantity in the spring
- 5. Zone I map at 1:6000 scale or larger, including significant topographic features and land uses
- 6. location map at 1:25000 scale with land uses within 1/2 mile radius
- 7. preliminary discussion of the proposed water collection system construction

III. Long-term Water Quality Sampling

During the first year of production, in addition to the water quality testing requirements stated in 310 CMR 22.00, the water quality in the spring shall be tested every three months for the routine chemical analyses parameters by a state certified laboratory. This quarterly sampling should occur after rainfall events.

4.3 Delineation of Aquifer Protection Zones I, II, and III.

4.3.3 (after first paragraph add)

A copy of the approved Zone II map will be provided to the planning board by the consultant at the same scale requested by the Planning Board. If the approved Zone II extends into another community, the water supplier must send a copy of the approved Zone II map to the Planning Board(s) in that community(s) with a request for assistance in protection of that area.

4.3.3.b add the following

(8) In certain cases where streams or lakes may act as recharge boundaries, the extent of the Zone II shall terminate at the nearest edge of this recharge feature relative to the pumping well. The recharging stream or lake would be part of the Zone III just as barrier boundaries (till and/or bedrock) are part of Zone III.

4.4 Source Final Report

4.4.3 (the second sentence should read)

Pumping equipment shall be selected with capacity no greater than the approved yield (expressed in gpm) unless special permission is received from DEP and shall be capable of operation at the approved yield for extended periods.

4.4.9.c add the following

(9) Water quality results from the monitoring well program shall be kept with the water purveyor and should only be reported to the DWS regional office when any detection occurs. The Regional office may require additional information from these wells.

4.4.10 add the following

4.4.10 For wells located proximal to a surface water feature that induce a high percentage of recharge from that feature, a discussion of the potential impacts from land uses located proximal to the surface water feature will be provided. This discussion will include, but not be limited to, impacts from land uses located within the Zone III and adjacent to said surface water feature. Land uses located in areas underlain by till and/or bedrock but in close proximity to the source will also be discussed. Upon evaluation of the submittal, DWS will ensure that the recommended monitoring well program adequately addresses these land uses.

4.5 Approval Conditions

4.5.6 (delete)

To meet peak demands, the DWS will allow the installation of a pump capable of pumping 1.5 times the approved rate. This will allow the approved pumping rate to be exceeded for periods of time when demands are high.

4.5.7 delete "increasing the" in the last sentence

4.5.8 add the following

8. Establishing Approved Yields - If DEP considers the technical data submitted insufficient to justify establishing a well's approved yield based on the doubling of an intermediate stage pumping test, DEP shall require that another pumping test be conducted on the final production well at the rate for which approved yield is sought. The pumping test shall go to stabilization and be monitored as was the prior test. Changes in aquifer characteristics, sensitive resources impacted and the extent of the Zone II shall be evaluated thoroughly and discussed with DEP.

4.5.9 add the following

9. Pump Capacity - DEP may grant special permission to allow the installation of a pump which has a pump rating curve that exceeds the Approved Yield only if it is demonstrated that this capability is absolutely necessary to meet daily peaks. If DEP considers oversizing the pump necessary, the following restrictions shall apply; the water level in the well must have stabilized during the pumping test at the peak of the pump's rating curve and the Approved Yield cannot be exceeded on a daily basis.

4.6 Wellhead Protection Zoning and Non-Zoning Controls

4.6.3 add (Delineation of Zone III) to the title

4.7 Conceptual Zone II for Existing Wells

add the following after the first paragraph

There is no difference in credibility between Zone IIs that have been delineated using a conceptual approach (analytical model, geological boundaries) versus those delineated using a more complex numerical modeling approach.

A generic RFP is provided in Appendix C to assist the water purveyor in adhering to Department regulations and guidelines in the delineation of Conceptual Zone IIs for existing sources. Further assistance is available from the Technical Services Section of the Division of Water Supply, Boston.

4.10 General Well Construction

4.10.6 Well Abandonment (add)

Refer to DEP's Standard Reference for Monitoring Wells (WSC-310-91 Chapter 4.6) for proper abandonment procedures.

7.6 Appurtenances

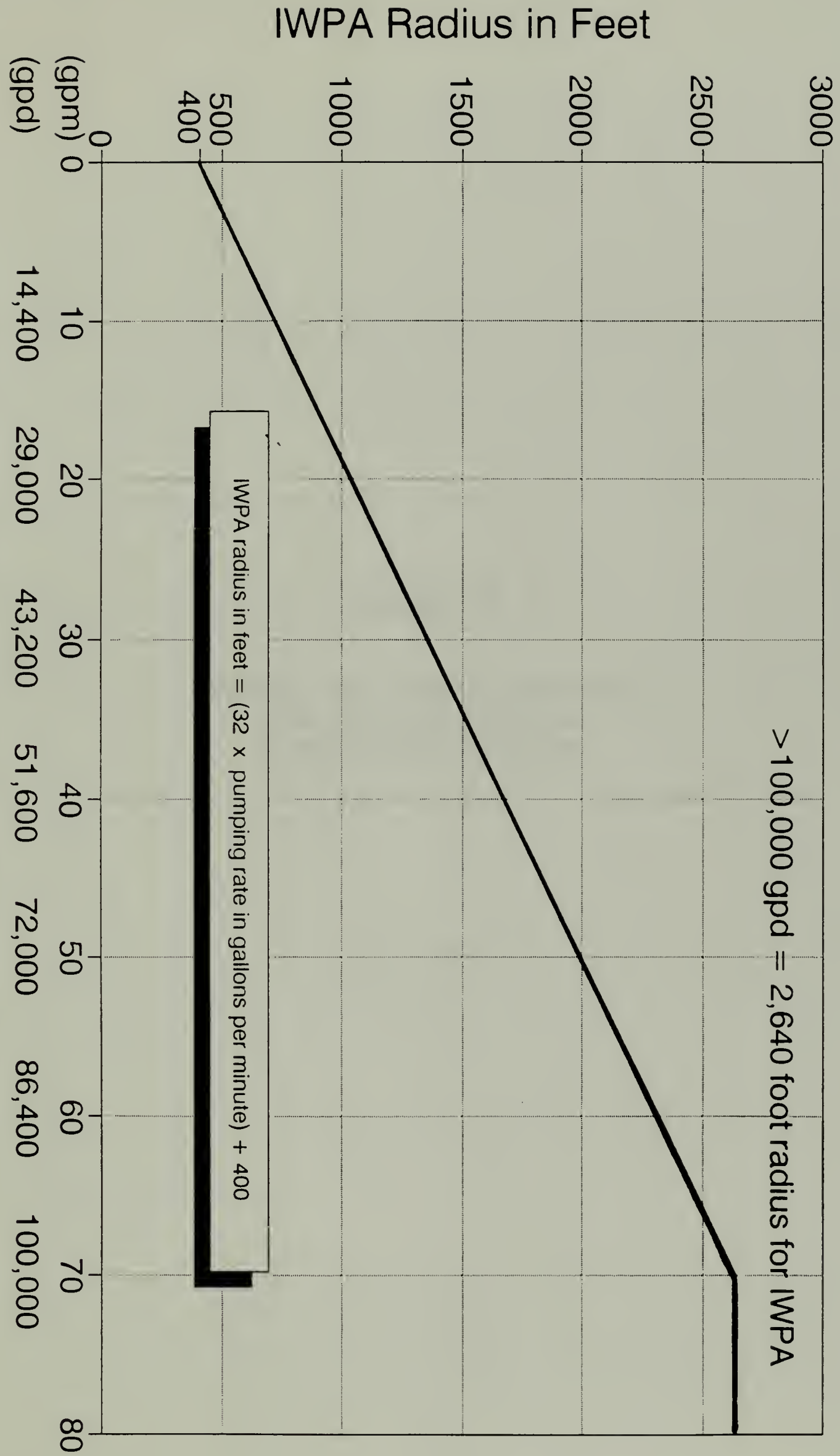
(6) Power

(b) It must be stored in approved above or below ground tanks. Above ground tanks must be anchored to a concrete platform with dimensions comparable to the tank size and constructed to below local frost line. Underground propane storage containers must be installed according to the National Fire Protection Association guidance #58-1989, Section 3.2.3.8 (248 CMR 6.00).

APPENDIX A

**INTERIM WELLHEAD PROTECTION
AREA GRAPH**

Pumping Rate vs. IWPA Radius



Approved Pumping Rate

APPENDIX B

GENERIC RFP FOR DELINEATING CONCEPTUAL ZONE II_s FOR EXISTING SOURCES

Request For Proposals For
Zone II Delineation for (specify well/wellfield name)
(Town/City), Massachusetts

1.0 Introduction

The Aquifer Protection Committee (specify Committee/Agency name) of the (Town/City) acting for the (Authority-Board of Selectmen/Mayor) is seeking proposals from qualified firms for hydrogeologic consulting services to delineate the Zone II of (well/wellfield) using Department of Environmental Protection/Division of Water Supply approved methods and protocols.

Paragraph two: Brief discussion of the location, yield and hydrogeology of existing well/wellfield for which the Zone II(s) is to be delineated.

NOTE: If funding mechanism is state/federal grant or similar award, the proponent may want to include the following paragraph:

The (Town/City) has received a (grant/award) of (monies) to delineate the Zone II(s) of this (well/wellfield). All work performed must be in accordance with current Department of Environmental Protection (DEP) regulations and guidelines for the delineation of Zone II.

The potential contractors are advised to review existing data available at the (Town/City) Water Department in order to submit an accurate proposal. Appointments can be made by contacting (name/title/telephone number).

2.0 Scope of Work

The Scope of Work for the project includes, but is not limited to, the review of all pertinent data including, if necessary, a description of fieldwork and methodologies to be used, completion of necessary pumping tests, the compilation and presentation of the data, and the submission of the results to the DEP for approval and responds to requests from DEP for clarifications and/or revisions.

The work tasks that may need to be completed by the selected consultants are delineated below. Detailed guidance for this work may be obtained from DEP/DWS.

2.1 Collection of Existing Data

The consultant shall compile all existing ground and surface water resource quantity and quality information for the aquifer including the capacity of the (well/wellfield) and all other data pertinent to (well/wellfield). This should include, but not be limited to: original ALA applications, (available at DEP); USGS Hydrologic Atlases, Data Reports and Water Quality Reports; DEP water quality data; consultant reports in the area; and reports on private,

commercial and industrial supplies; private wells and surface water bodies.

2.2 Compilation and Presentation of Data

The consultant shall prepare a report describing all tasks performed and methodologies used during the investigation. The report should include all field data and documentation of procedures used to calculate the technical parameters defined as elements of the hydrogeologic study. Five copies of a draft report shall be submitted to the (specify Committee/Agency name) for review and DEP approval. Ten copies of the final report shall be submitted to the (specify Committee/Agency name) for distribution to other appropriate (Town/City) agencies.

In addition to the report, the consultant shall prepare two (2) separate reproducible, mylar maps illustrating the (well/wellfield) Zone II and the Zone III recharge area; one using the USGS Topographic Maps as base (Scale 1:25000) and another using (Town/City) Zoning Map as a base (scale 1"=1,000'). If possible, the legal description of property within Zone II shall be included on the plans. The consultant shall provide the (specify Committee/Agency name) with reproducible mylar copies of these plans.

The maps will be based on data collected throughout the investigation for use by all (Town/City) agencies. These maps shall be developed using USGS topographic maps (scale 1:25000) as a base with information being displayed on mylar overlays. The mylar overlays shall include information such as: the defined Zone II and the Zone III recharge area for the (well/wellfield); (water table/potentiometric) elevation contours; the locations and elevations of all pertinent wells (including private wells), borings, seismic transverses, and other subsurface data; surficial geology; bedrock geology; bedrock elevation contours; saturated thickness of unconsolidated materials; and the location of DEP disposal sites which includes confirmed sites and sites to be investigated.

2.3 Conceptual Zone II Model

The Consultant shall develop a conceptual model of the aquifer. This should include a preliminary analytical model of the Zone II. Data from existing sources should be utilized in this preliminary Zone II estimate. This effort should address aquifer, boundary, and well characteristics. This conceptual model will be used as a basis for determining what level and type of additional hydrogeologic work is necessary.

Identify all data deficiencies in the existing information. This should include: aquifer extent, thickness and characteristics; boundary conditions; well locations, characteristics and pumping history; the distribution of hydraulic head under pumping and non-pumping conditions; current water quality; and existing and potential sources of contamination.

2.4 Pumping Test (NOTE: If a pumping test is required the following should be included.)

A pumping test proposal must be submitted to the appropriate DEP/DWS regional office for review and approval prior to the commencement of the pumping test. The location and

utility of all existing test wells and observation wells should be verified. A determination of the number and location of additional observation wells should be made to; characterize the direction of groundwater flow, determine aquifer characteristics and boundary behavior, and construct an accurate (water table/potentiometric surface) elevation map for the study area.

The pumping test (may/will) involve the installation of (specify number if known) additional wells in (specify number if known) locations including a background or ambient well. The wells will be screened in the same aquifer materials/stratigraphic horizon as the well/wellfield and will be approximately (specify depth if known) feet deep. A geologist should supervise the installation of the wells and collect sediment samples to determine general sediment characteristics and changes in strata. During the drilling a geologist should maintain a field lithologic log for each well and record the depth, diameter and screened interval for each well. The locations of these wells will then be plotted on an overlay to the base map. The wells should be developed and tested for good hydraulic connection with the aquifer.

The consultant shall determine the distribution of hydraulic head under steady state nonpumping conditions. The pumping wells should be shut down for as long as possible or until 95% recovery has been attained. Water levels during this phase should be measured at a minimum of once a day. The head distribution measured may need to be corrected for steady state ambient conditions. The depth, diameter and screened interval of each well used should be known. This head distribution may then be used as initial conditions for groundwater modeling or as a target for model calibration and validation.

The Consultant shall conduct a pumping test to determine aquifer and boundary characteristics. The pumping test should be conducted with a steady pumping rate of (yield) gallons per minute throughout the test. This may require that a step-drawdown pumping test be conducted prior to the test to determine the optimal pumping rate. The observation wells should be placed so that the behavior of boundaries may be determined. There should be an observation well outside the area of influence to measure ambient conditions during the test. The observation wells should be measured such that there are ten water level readings in each log cycle of time beginning with $t=0.5$ minute. The discharge line for the pumped well should be filled prior to pumping and located so as to discharge outside the area of influence of the well/wellfield. Recovery readings should be taken in appropriate observation wells at the same frequency as the drawdown readings beginning at $t=0.5$ minute after shut down. Recovery readings should be taken for as many days as the production well is pumped or 95% recovery has been attained.

Water Department personnel (may/will) be available for some water level measuring.

2.5 Delineation of Zone II

Determine the Zone II using the appropriate (analytical/numerical) model. The development and application of the model utilized and all Zone II delineation efforts should conform to the latest edition of the "Guidelines and Policies for Public Water Systems." The consultant shall submit the Zone II delineation to the DEP for approval and expedite them on behalf

of the (Town/City). The Zone II should then be plotted on an overlay to the base map. In addition, the consultant shall delineate the Zone III recharge area for (well/wellfield) based on available topographic, hydrogeologic and geologic data.

2.6 Field Studies and Additional Data Gathering

The consultant shall describe additional field studies necessary to complete the tasks presented above. This may include the installation of groundwater monitoring wells, test wells, aquifer tests, seismic studies, public water supply analyses, and water quality sampling.

2.7 Review of Proposed Zoning By-Law (NOTE: Optional)

The Consultant shall review and make written comments on the existing (Town/City) Aquifer Protection by-law. Comments on the by-law should be submitted with the draft report.

2.8 Additional optional work to be priced separately

Assess the water quality of the Zone II and install a monitoring system downgradient from any potential contamination source(s). It may be necessary to sample the wells for pH, conductivity, coliform bacteria, nitrate, nitrite, ammonia, sodium, chloride, VOC's, SOC/IOC or Radon. The monitoring well installation and sampling program will follow protocols submitted by the consultant. Analysis techniques and "chain of custody" procedures should be indicated and are subject to review. Provide recommendations for water supply protection and management technique based on the results of the quality assessment.

2.9 General Comments

- a. It is understood that all work tasks be well documented and all field activities will be supervised by a qualified geologist who is also knowledgeable in water supply development and that all water quality analyses will be performed by a lab certified by the state for the contaminants in question. Well drillers must be registered by the Commonwealth of Massachusetts.
- b. In responding to this RFP, the Consultant is encouraged to alter, amend, or add to any of the detailed work tasks. In order for this to be done, however, the Consultant must clearly demonstrate the benefits of making any substitutions or changes in the response to this RFP.
- c. The DWS Guidelines and Policies for Public Water Systems should be consulted for all aspects of the Zone II delineation process.

3.0 Reporting Requirements

The Consultants shall develop a milestone chart containing schedules for task(s) and the funding allotment which will provide a tracking system for the Project manager in overseeing

the timely completion of the task(s) within the budgetary funding. The Consultant will be required to meet with the (Town/City) from time to time through the course of the study to present findings prior to proceeding with each task. Any changes in the schedule or work plan must be immediately reported to the (Town/City) for approval prior to implementation.

3.1 Letter Reports

Two (2) copies of progress letter reports must be submitted to the (Town/City) prior to the commencement of each project task. Each project letter report shall include:

- a. A summary of the current project status;
- b. A statement on the time and funds expended;
- c. A statement of any anticipated personnel changes.

The Consultant will be required to meet with the (Town/City) from time to time through the course of the study to present findings prior to proceeding with selective field tasks.

3.2 Pumping Test Proposal

The Consultant will submit 2 copies of the pumping test proposal with the proper transmittal and permit forms to DEP/DWS in accordance with DEP requirements. The Pumping Test Proposal shall conform to the criteria set forth in the current " Guidelines and Policies for Public Water Systems".

3.3 Draft Report

A Draft Report (2 copies) containing discussion of the above tasks, should be submitted to the (Town/City). It should include:

- a. An executive summary;
- b. An introduction, statement, and background summary;
- c. A discussion of the various information sources, reports, and any remaining data deficiencies;
- d. A detailed summary of findings;
- e. Maps specified in the scope of work;
- f. Should be in accordance with DEP requirements for a Zone II delineation for an existing public water supply source as per the guidelines.

3.4 Final Report

After all review comments of the draft report have been addressed, the Consultants will prepare ten (10) copies of a final report.

4.0 Proposal Due Date

One (1) original and six (6) copies of the proposal shall be submitted on or before (time) at

the (Location), MA. Proposals shall be evaluated and finalists selected. A selection will be made by the (specify Committee/ Agency name) on or before (Date). Further information on the selection process is contained elsewhere in this Request for Proposals.

5.0 Information Regarding the Contract

5.1 Draft Contract

A copy of the draft contract is available upon request from the (specify Office/Agency name), (address).

5.2 Time

All the work under the contract shall be completed by (Date). A work schedule and plan of work, indicating start and completion dates and the sequence of the work tasks to be performed, should be included in the proposal.

5.3 Progress Meetings

The Consultant shall be prepared to attend five (5) meetings with the (specify Committee/Agency name) and (Town/City) representatives to present and/or discuss the results of the investigation. These meetings include:

1. An initial scoping session,
2. An interim work in progress meeting,
3. A presentation of draft report meeting,
4. A meeting regarding the final report, and
5. Public presentation of study results.

5.4 Proposals

To be considered, respondents shall submit a complete proposal to this RFP using the format provided in this request package. Proposals failing to adhere to the (Town/City) prescribed format may be ruled ineligible. The proposal shall be typewritten (double spaced) with pages numbered and signed in ink by an official authorized to bind the company to its provisions. The proposal must include a statement that the prices quoted remain valid for at least thirty (30) days from the due date for proposals to this RFP. The contents of this RFP and the proposal will become contractual obligations, if a contract ensues. Proposals should be prepared simply and economically, providing a concise description of the respondent's ability to meet the requirements of the RFP. Emphasis should be on completeness, clarity and on a straight-forward description of technical and management approach and how the respondent will accomplish the tasks noted in this RFP. All proposals and materials submitted will be considered the property of the (Town/City).

5.5 Proposal Contents

1. Information which demonstrates the professional and technical proficiency of the proposer's staff at successful groundwater management and of Zone II delineations.
2. A list of DEP approved Zone II delineations conducted by the firm in the recent past and whether these delineations were determined using conceptual analytical or numerical methods. The proposal shall also include a list of references.
3. A detailed proposal specifying the technical approach to be used by the consultant and the associated costs. All costs shall be enumerated by item and should note any subcontracting costs that may be required. Estimated man-hours, per category of personnel, for each task should also be included. The proposal should contain the proposer's rates for this project. Tasks in which the proposer plans to use Water Department labor, or the services of other (Town/City) officials and/or consultants should also be noted. This portion may also include any recommendations for enhancing the project.
4. A list identifying key personnel to work on this project, including their qualifications and experiences as well as their expected role and the extent of their participation in this project.
5. Attach non-collusion and tax statement signed by the authorized representative of the firm(s).

5.6 Teaming Arrangements

Joint ventures, teaming arrangements or consortia are permissible only if the proposal indicates a single business entity as the prime contractor having complete fiscal and managerial responsibility under the contract. Regardless of the arrangement, respondents are advised that the prime contractor must possess significant management and technical capability, experience and resources. Prime contractor designation shall not be for the purpose of merely establishing a "local" presence or for circumventing the requirements stated in this RFP.

5.7 Performance and/or Delivery of Services

The (Town/City) reserves the right to seek and consider any and all information it deems appropriate to evaluate the respondent's ability and fitness to render the services encompassed by this RFP, including interviewing key personnel identified in proposals. Respondents shall identify in their proposal their availability to begin work, to assemble, deploy and maintain qualified project personnel, complete with resumes to maintain high service standards, and any other capabilities and resources which they feel surpass the (Town/City) minimum needs regarding the performance and/or delivery of services, as stated in this RFP.

5.8 Personnel

The respondent agrees by submission of a proposal to assign to the contract any project assignments thereunder, those persons whose resumes are submitted with its proposal. Substitutions shall require the (Town/City) approval. All proposed substitutions must possess like or comparable qualifications to the person to be replaced.

6. Selection Criteria

The Consultant will be chosen on the basis of the criteria listed below:

1. Quality and responsiveness of Proposal.
2. Qualifications of Firm, Organizational chart and list of persons working on the project. One person on the team must be a geologist or hydrogeologist with experience in ground water source development and Zone II delineation.
3. Qualifications of individuals assigned to Project Team. Field technicians should have 2-5 years experience in well drilling and soil sampling. Water quality samples must be tested by a certified Massachusetts State Laboratory. Senior Project Manager must have a minimum of 5 years experience in the environmental and water supply field.
4. Past performance on jobs of equal or greater complexity in nature in the related field. References and contact people with telephone numbers from their past projects.
5. Financial security, proof of insurance, payment and performance bonds.

Further Evaluation

If, after completing the evaluation outlined above, the (Town/City) finds that two or more proposals are more or less equal, it reserves the right to re-evaluate said proposals placing greater emphasis on any or all of the following factors:

- Prices quoted;
- Past performance record;
- Special experience or abilities of the firm and subcontractors in the type of work or project assignments likely to be assigned;
- Capability of the firm to accomplish the work in the time required;
- Size of the firm and availability of personnel;
- Other criteria related to the ability of the firm to perform the work.

The (Town/City) reserves the right to seek additional information from proposers and to schedule interviews with the most qualified.

The (Town/City) reserves the right to reject any and/or all proposals wholly or in part and to make awards in a manner deemed in the best interest of the (Town/City). The (Authority-Board of Selectmen/Mayor) of the (Town/City) is the awarding authority and must approve the contract.

The (Town/City) is an Affirmative Action/Equal Opportunity Employer.

Questions regarding this project or the proposal requirements should be directed to (Person

and Title).

Any questions must be made prior to submitting the proposal. No further consideration will be given after the deadline for receipt.

APPENDIC C
DWS POLICIES

APPENDIX C

Table of Contents

DWS Policy 91-02.....	Treatment for Radionuclide Removal
DWS Policy 91-06.....	Variances From the Total Coliform Rule
DWS Policy 91-07.....	Acceptability of Results from Radiological Laboratories Certified Outside Massachusetts
DWS Policy 91-09.....	Use of Bottled Water by Public Water Supplies
DWS Policy 91-10.....	When to Use a Pre-Enforcement Letter
DWS Policy 91-11.....	Minimum Information for the Cover Page of a Notice of Non-Compliance
DWS Policy 92-05.....	Procedure for Determining the Activity Type and Status of a Drinking Water Source
DWS Policy 92-06.....	Division of Water Supply - Operational Consistency
DWS Policy 92-07.....	Bulk Water Suppliers Sampling Requirements and Transport Responsibilities
DWS Policy 93-01.....	Requirements for Disinfection with Water Supply Treatment
DWS Policy 93-02.....	Operation and Maintenance Manuals



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 91-02

Date: 03-18-93

DWS Policy 91-02

Treatment for Radionuclide Removal

This policy is adopted to provide public water systems and the DWS with procedures for processing requests for approval of treatment for the removal of radionuclides from drinking water.

Policy

It is the policy of the Division of Water Supply to promote radionuclide treatment techniques that do not produce a liquid or solid radioactive waste.

The following procedures shall be followed for Public Water Systems requiring treatment for radionuclide removal:

- I. - The Division recommends treatment techniques that do not produce a liquid or solid radioactive waste. The preferred accepted treatment methods are packed tower aeration (PTA) or diffused bubble system (DBS).


- DWS will arrange coordination with DAQ for PWS seeking approval to use PTA (or DBS) as a treatment technique.
- II. - If the treatment method to be used will generate liquid or solid wastes containing natural radioactivity, the applicant will be required to apply for a determination of need for a license from the Massachusetts DHW.

Approved: May 18, 1993

Effective: May 18, 1993

DB/mn

a:/mneedham/po/9100


David Y. Terry, Director
Division of Water Supply



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 91-06

Date: 03-18-93

DWS Policy 91-06

Variances From The Total Coliform Rule

This policy is adopted to establish criteria to be used in evaluating requests for variances from the Total Coliform Rule.

POLICY

It is the policy of the Division of Water Supply, Department of Environmental Protection, to allow a public water system to operate under a variance to the total coliform rule if the system can demonstrate, using the following criteria, that no unreasonable risk to health exists:

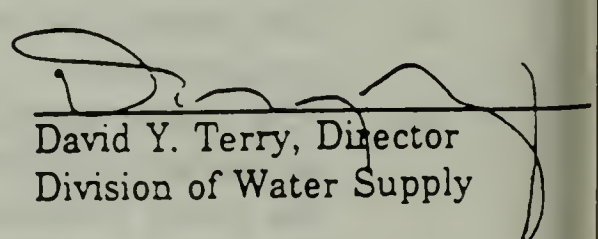
- (1) Over the past thirty days, water entering the distribution system is shown to:
 - (a) Be free from E. Coli or fecal coliform occurrence based on at least daily sampling,
 - (b) Contain less than one total coliform per hundred milliliters of influent water in at least ninety-five per cent of all samples based on at least daily sampling,
 - (c) Comply with the total turbidity requirements of MR 22.08, except that surface waters presently filtering should comply with 310 CMR 22.20A(4), and
 - (d) Contain a continuous disinfection residual of at least 0.2 mg/l;
- (2) The system had no waterborne disease outbreak while operated in its present configuration;
- (3) The system maintains biweekly contact with the Division of Water Supply and the local board of health to assess illness possibly attributed to microbial occurrence in the public drinking water system;
- (4) The system has evaluated, on a monthly basis, at least the number of sampled specified in 310 CMR 22.05A(1) and has not had an E.Coli-positive compliance sample within the last six months, unless the system demonstrates to the

- Department that the occurrence is not due to contamination entering the distribution system;
- (5) The system has undergone a sanitary survey conducted by the Department within the past twelve months;
 - (6) The system has a delegated cross connection control program acceptable to the Department and performs an audit of the effectiveness of the program;
 - (7) The system agrees to submit a biofilm control plan to the Department within twelve months of the first request for a variance;
 - (8) The system monitors general distribution system bacterial quality by conducting heterotrophic bacteria plate counts on at least a weekly basis at a minimum of ten percent of the number of total coliform sites specified for that system size in 310 CMR 22.05A(1)(preferably using the R2A medium in method 907A, 907B, or 907C as set forth in the 16th edition of Standard Methods for the Examination of Water and Wastewater, 1985, American Public Association, et.al.); and
 - (9) The system conducts daily monitoring at distribution system sites approved by the Department and maintains a detectable disinfectant residual [measured as specified in 310 CMR 22.20A(a)5] at a minimum of ninety-five percent of those points and a heterotrophic plate count of less than 500 colonies per ml [measured as specified in 310 CMR 22.20A(5)(a)3] at sites without a disinfectant residual.

Rationale

On January 15, 1991 the EPA published a notice in the Federal Register staying the no variance provision of the Total Coliform Rule (40CFR Part 141.4 and 141.63). States can now grant a variance to water systems that meet certain criteria. This change was made because of regrowth problems being experienced by many water systems as a result of biofilm.

Approved: May 18, 1993
Effective: May 18, 1993


David Y. Terry, Director
Division of Water Supply

DB/mn
a:/mneedham/p-9106a.wp



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 91-07

Date: 03-18-93

DWS Policy 91-07

Acceptability of Results from Radiological Laboratories Certified Outside Massachusetts

This policy is adopted to establish uniform criteria for acceptability of radiochemical analyses submitted to the Massachusetts Department of Environmental Protection by Massachusetts Public Water Supplies.

POLICY

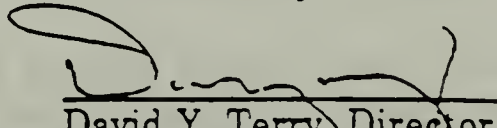
It is the policy of DEP to accept the results of radio-chemical analyses performed by laboratories which are certified by the EPA. Such laboratories must continue to participate in performance evaluation studies and in laboratory intercomparison cross check studies which include the analyses for which the laboratory is certified or seeking certification. This policy is in conformance with the laboratory certification regulations which were promulgated on September 13, 1991.

Rationale

With the proposed changes to the drinking water regulations for radiological contaminants proposed in June 1991 and the current need for radiological analyses it is felt this issue needs to be addressed. Currently the Commonwealth is not able to do lab certification for radiochemistry because there is no person certified by EPA to do it. To be able to cope with the increased number of samples that will be required by the radiological regulations when they are promulgated water supplies will need to have access to certified laboratories outside Massachusetts.

Approved: May 18, 1993

Effective: May 18, 1993


David Y. Terry, Director
Division of Water Supply

DB/mn

a:/mneedham/po/9107a



THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY
5408 S. UNIVERSITY AVENUE
CHICAGO, ILLINOIS 60637
TEL: 773-837-3200
FAX: 773-837-3201
WWW.CHEM.UCHICAGO.EDU

THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY
5408 S. UNIVERSITY AVENUE
CHICAGO, ILLINOIS 60637
TEL: 773-837-3200
FAX: 773-837-3201
WWW.CHEM.UCHICAGO.EDU



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy #91-09
March 18, 1993

POLICY 91-09

Use of Bottled Water by Public Water Suppliers

Background: Many noncommunity and small community systems have requested a decision as to whether provision of bottled water would remove them from being regulated as a public water system. If the DWS approved the process it would result in huge cost savings for the system.

Rationale: In accordance with the federal regulation (section 1401(4) of the SDWA), Massachusetts DEP defines a public water system as "a system for provision to the public of piped water for human consumption if such a system has at least.....regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days of the year." EPA's opinion in letters dated 12/14/89 to Dr. Mahan of Tallahassee, Florida and Chief Walter Andrews of EPA Region II is that human consumption has been interpreted by the U.S. District Court for the Eastern District of California in the case of U.S. vs. Midway Heights County Water District as including such normal uses as bathing, showering, cooking, dishwashing and oral hygiene."

Policy: If a system provides water for any of the normal uses such as bathing, showering, cooking, dishwashing and oral hygiene, it is providing water for human consumption and is a public water system subject to regulations under the SDWA and the state Drinking Water regulations. A public water system may not escape the regulations by providing bottled water for drinking if the system provides water for other normal everyday uses.

NOTE: The fact that a noncommunity water system provides bottled water for drinking would not, by itself, affect this determination since human consumption includes more than simply drinking the water. Further, it is important to keep in mind that according to 40 CFR 141.101, a public water system may not use bottled water or point of use devices as a means of achieving compliance with a maximum compliance level (MCL). Bottled water and point of use devices may only be used on a temporary basis, usually as a condition of a variance or an exemption, to avoid an unreasonable risk to health.


March 18, 1993

Attachments:

- (1) U.S. EPA letter from Michael B. Cook, Director, Office of Drinking Water dated 12/14/89 to Charles S. Mahan, M.D., Deputy Secretary for Health and State Health Officer, Department of Health and Rehabilitative Services, Tallahassee, Florida.
- (2) U.S. EPA memo from Michael B. Cook, Director, Office of Drinking Water dated 12/14/89 to Walter Andrew, Chief, Drinking Water and Ground Water Protection Branch, Region II.

Approved: March 18, 1993

Effective: March 18, 1993



David Y. Terry, Director
Division of Water Supply

YD/hh(policy91)

p:\ewhite\wq\pol91-09.yd (ed.S/27/93)

b:\drb policies\pol91-09.yd)

DEC 14 1989

OFFICE OF
WATER

Charles S. Mahan, M.D.
Deputy Secretary for Health
and State Health Officer
Department of Health and Rehabilitative
Services
1317 Winewood Boulevard
Tallahassee, Florida 32399-0700

Dear Dr. Mahan:

This is in response to your August 16, 1989, letter requesting clarification on EPA's official position on the use of bottled water by a noncommunity system to avoid being considered a public water system subject to the Safe Drinking Water Act (SDWA). I understand that this has particular importance to the Florida program as systems subject to the SDWA are under the jurisdiction of the Florida Department of Environmental Regulation and the "other" systems are under the control of the Florida Department of Health and Rehabilitative Services.

A public water system is defined by Section 1401(4) of the SDWA as "a system for the provision to the public of piped water for human consumption." "Human consumption" has been interpreted by the U.S. District Court for the Eastern District of California in the case of U.S. v. Midway Heights County Water District as including such normal uses as bathing, showering, cooking, dishwashing, and oral hygiene. If a system provides water for these normal uses, then, it is providing water for human consumption and is a public water system subject to regulation under the SDWA.

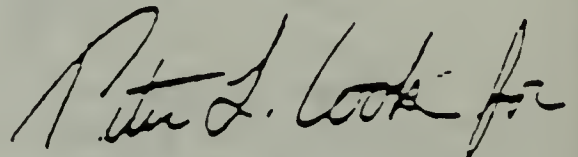
The fact that a noncommunity water system provides bottled water for drinking would not, by itself, affect this determination since human consumption includes more than simply drinking the water. Further, it is important to keep in mind that according to 40 CFR 141.101, a public water system may not use bottled water or point of use devices as a means of achieving compliance with a maximum contaminant level (MCL). Bottled water and point of use devices may only be used on a temporary basis, usually as a condition of a variance or an exemption, to avoid an unreasonable risk to health. Point of entry devices may be used

to achieve compliance with an MCL only if the conditions specified in 40 CFR 141.100 are satisfied.

In conclusion, in general, a noncommunity water system may not escape regulation by providing bottled water for drinking if this system provides water for other normal, everyday uses. In such situations, the system is providing water for human consumption and is subject to the SDWA and the National Primary Drinking Water Regulations (NPDWRs).

I would be pleased to discuss this further. If you have any further questions on this matter, please contact me or have your staff contact Betsy Devlin at (202) 382-2303.

Sincerely,



Michael B. Cook, Director
Office of Drinking Water

cc: Mike Leonard, Region IV

DEC 14 1989

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Regulation of Nontransient Noncommunity Water Systems which Use Bottled Water for Drinking Purposes.

FROM: Michael E. Cook, Director
Office of Drinking Water

Peter J. Cook

TO: Walter Andrews, Chief
Drinking Water and Ground Water
Protection Branch, Region II

This is in response to your request for written guidance on the following question: Is a nontransient noncommunity water system which uses piped water only for lavatories and sinks, but provides bottled water for drinking purposes, a public water system under the Safe Drinking Water Act (SDWA)?

A public water system is defined by Section 1401(4) of the SDWA as "a system for the provision to the public of piped water for human consumption." "Human consumption" has been interpreted by the U.S. District Court for the Eastern District of California in the case of U.S. v. Midway Heights County Water District as including such normal uses as bathing, showering, cooking, dishwashing, and oral hygiene. The nontransient noncommunity system using the piped water for lavatories and sinks, therefore, is providing water for human consumption and thus is a public water system.

The fact that a sign is posted indicating that the water is not potable would not, by itself, affect this determination since human consumption includes more than simply drinking the water. In addition, under our regulations at 40 CFR 141.101, a public water system may not use bottled water or point of use devices as a means of achieving compliance with a maximum contaminant level (MCL). Bottled water and point of use devices may only be used on a temporary basis, usually as a condition

of a variance or an exemption, to avoid an unreasonable risk to health. Point of entry devices may be used to achieve compliance with an MCL only if the conditions specified in 40 CFR 141.100 are satisfied.

In conclusion, in general, the nontransient noncommunity water systems in question are public water systems and must comply with the National Primary Drinking Water Regulations (NPDWRs). I hope this is responsive to your concerns. Should you have any questions on this matter, please call Bob Blanco (FTS 382-5522) or have your staff contact Betsy Devlin (FTS 382-2303).

cc: Drinking Water/Groundwater Protection Branch Chiefs
Region I and III - X

III. DEFINITIONS: POLICY AND REGULATORY

Issue No. 5: Meaning of "Human Consumption" and "Graywater Uses" as it relates to Public Water Systems

On February 26, 1988, the United States District Court settled the U.S. v. Midway Heights case in part by claiming "human consumption includes drinking, bathing, showering, cooking, dishwashing, and maintaining oral hygiene." Do these statements claim that inhalation alone can constitute human consumption? For example, a hospital has its own well which it uses solely for laundry purposes (the rest of its water is supplied by a Public Water System), would this use constitute human consumption? In addition, what types of water consumption are included in EPA's definition of "gray water uses?"

Response:

In U.S. v Midway Heights County Water District, the water district contended as part of its defense that it was not a public water system and thus not subject to the Safe Drinking Water Act (SDWA) or the National Primary Drinking Water Regulations (NPDWRs) because it did not supply water for "human consumption", that is, drinking. The court, as noted above, found that human consumption was more than just drinking. Moreover, the court found that the defendant knew or should have known that the water was being used for human consumption (due to the pipes running into the homes and other facts specific to this case) and that the agreement between the district and the customers which "apparently purports to limit the use(s) of defendant's water to irrigation is ineffective to take defendant's water system out of reach of the Safe Drinking Water Act which was enacted to protect the public health."

In its opinion, the court did not expressly deal with the question of inhalation as it was not dealing with types of exposure to contaminants. It is our opinion, however, that the court was interpreting consumption in a broad sense, that is, human consumption includes all normal, everyday purposes. If an individual uses the water provided by a system for bathing or dishwashing, arguably, that individual would be exposed to contaminants in the water through inhalation. In this sense, then, inhalation could be considered consumption.

(Continued on next page)

III. DEFINITIONS: POLICY AND REGULATORY

Issue No. 5: Meaning of "Human Consumption" and "Graywater Uses" as it relates to Public Water Systems (Cont'd)

Considering your example of the hospital which has its own well used only for laundry purposes, laundry arguably fits under the definition of human consumption. Therefore, this supply is subject to the SDWA and the NPDWRs.

If, however, the hospital could demonstrate that the system for the laundry is completely separate from the system providing the water for patient and staff use, then an argument could be made that the system used for laundry purposes may not be subject to the NPDWRs. In order to demonstrate this complete separation, the hospital would have to show, that there are different plumbing systems, that there are no "laundry" sinks or faucets available for patient or staff use, and that there are no interconnections whatsoever. However, hospitals are often required to have back-up systems to provide water for patients and staff in case of an emergency. If the "laundry system" is in fact the back up system, then it would clearly be for "human consumption" and would be subject to the SDWA and the NPDWRs (if it satisfied the definition of a NCWS, i.e., was used for the requisite number of days per year).

Source: Betsy Devlin (August, 1989)

Note: This Issue specifically addresses Gray-Water Systems as Public Water Systems and therefore replaces Issue Numbers One and Two of Edition Four's Section V. That Section has been renamed "TOTAL COLIFORM RULE REQUIREMENTS".



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 91-10

Date: 3-18-93

DWS Policy 91-10

When to Use a Pre-Enforcement Letter

This policy is adopted to establish uniform guidance concerning when to use a non-standard enforcement letter instead of the standard DEP Enforcement letter.

POLICY

It is the policy of the Division Water Supply to use the standard DEP enforcement notification formats for all violations of regulations or non-conformance with guidelines and policies. Exception to this policy may be allowed for the following reasons:

1. Issuance of enforcement notices on new regulations or policies/guidances; when it is determined by the Section Chief and the WQA Program Manager (lead enforcement person) that it is possible that the public water system(s) is unclear as to the nature of the violation/non-conformance and technical assistance is needed. In this case a Pre-Enforcement letter will provide training as well as warning of further action. This type of notice should lead to the system contacting DEP/DWS for assistance.
2. Issuance of enforcement notices to new public water systems; when it is determined by the Section Chief that it is possible that the system is unclear of the nature of the violation/nonconformance. This Pre-Enforcement letter should only be used once per regulation per new system.
3. Issuance of enforcement notices to several hundred recalcitrant systems on one program at one time; when it is determined by the Section Chiefs and WQA Program Manager (lead enforcement person) that the cost out-weighs the benefit of sending certified standard notices to all the non-conforming systems and compliance can be achieved with a less costly Pre-Enforcement letter.



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 91-11

Date: 03-18-93

DWS Policy 91-11

Minimum Information for the Cover Page, of a Notice of Non-compliance

This policy is adopted to establish standard language to be used when preparing Notices of Non-compliance.

POLICY


It is the policy of the DWS to insert the following or similar language into the cover page of all Notices of Non-compliance, as appropriate.

"Department records show this is the _____ non-compliance of this type to occur within a 12 month period. If this type of non-compliance occurs for a __ time within a 12 month period the (insert Water Department's name) will be considered (to be, or, in danger of becoming) a significant non-complier and (will be, or, is) required (to submit a plan detailing what specific action will be taken to prevent further non-compliance from occurring). In addition you may be subjected to federal enforcement action."

For future reference, please be aware that the (insert Water Department name) can post public notice in accordance with 310 CMR 22.16 immediately upon learning of the noncompliance. Upon receiving a copy of the Public Notice, the Department will not issue a NON but will issue a Notice of Violation and Compliance (NVC), noting the violation and the action taken as well as including any further instructions. The Department will however keep a record of all MCL exceedences within the public water system."

Approved: May 18, 1993

Effective: May 18, 1993


David Y. Terry, Director
Division of Water Supply

DB/mn

a:/mneedham/po/9111a



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 92-05

Date: 4/18/93

DIVISION OF WATER SUPPLY 92-05

PROCEDURE FOR DETERMINING THE ACTIVITY TYPE AND STATUS OF A DRINKING WATER SOURCE

Policy

This policy is adopted by the Division of Water Supply to provide guidance in interpreting the activity type, status, monitoring and special permit requirements of a public drinking water source as defined in 310 CMR 22.02. Relationship of these items to Water Supply source type is as shown below:

	SOURCE TYPE	ACTIVITY STATUS	MONITORING REQUIREMENTS	SPECIAL PERMIT REQUIREMENTS
1)	PRIMARY as defined in 310 CMR 22.02	ACTIVE IN USE, ON LINE as defined in 310 CMR 22.02	As required by 310 CMR 22.00 and DEP Approval letters	None
2)	BACK-UP (Sometimes called standby) as defined in 310 CMR 22.02	ACTIVE IN USE May or may not be ON LINE (see Note #1)	As required by 310 CMR 22.00 and DEP Approval letters (same as primary source) (see Note #1)	See Note #1
3)	EMERGENCY as defined in 310 CMR 22.02	ACTIVE (See Note #2) or INACTIVE (see Note #3) may or may not be ON LINE or IN USE	As specified by DEP at time of request for emergency use (PWS may maintain in some manner (see Note #2)	Yes Emergency Declaration regulation applies MGL 21G §15, 16, 17 and DWS Policy 89-05, etc.
4)	ABANDON as defined in 310 CMR 22.02	INACTIVE	None	Yes Requires DEP approval to abandon in accordance with 310 CMR 22.03(6)

1. If the source is not on line, then sample collection must be as follows: Wells must be sampled after stabilization of a water quality parameter occurs. In order to stabilize a water quality parameter in a well, it must be pumped at a rate approaching the production rate for 20 minutes. At the 20 minute mark, begin taking and recording temperature readings at 5 minute intervals. The well water quality is considered to be stabilized when three consecutive temperature readings do not vary more than 5%.
(Example reading #1 = 50°F; reading #2 = 51°F; reading #3 = 52.5°F. Stabilization has occurred because the variation between readings #1 and #3 = 2.5°F or 5%).

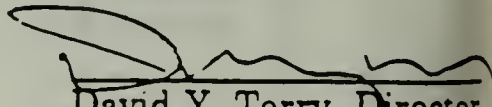
Surface water sources may be sampled at the disinfection station.

2. If a public water supply designates a source as an active emergency source, it must submit and develop a maintenance plan and a protocol for its use. This information must be included in its emergency response plan. The wellhead and watershed area must be maintained and periodic sanitary surveys done. However, it may only be connected into the system with DEP permission.
3. An emergency source may be any source that could be used during an emergency.

DWS must retain all public drinking water sources in its inventory according to their activity status.

Approved: May 18, 1993

Effective: May 18, 1993



David Y. Terry, Director
Division of Water Supply

DB/ecw

b:(pol)\pol92-05



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

C-4

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 92-06
22 December 1992

DWS POLICY 92-06

DIVISION OF WATER SUPPLY - OPERATIONAL CONSISTENCY

Rationale

In order that the Division of Water Supply maintain its credibility and the respect of the regulated community and consultants with whom we do business, a high degree of importance is placed on responding to similar circumstances in a consistent manner. In this regard, the Division uses a variety of tools to assure consistency of operation. In no way are these tools meant to stand in the way of independent judgement in response to special circumstances.

This document describes the tools employed by the Division of Water Supply to assure consistency in operations (regional activities) and programs.

Policy

It is the policy of the Division of Water Supply to oversee and regulate the operation of public drinking water systems in a consistent manner, as described below:

A. GUIDELINES

The Guidelines have been developed to provide a reference to DEP staff, public water suppliers and their employees, and consulting engineers and hydrogeologists. They are structured to address facets of water source development, construction, treatment, distribution and water management.

B. POLICIES

Policies have been drafted to clarify interpretation of the Massachusetts Drinking Water Regulations, and to establish a protocol for addressing site specific problems which have potential to recur in the administration of the Regulations. Policies can be initiated

at any level and are reviewed for comments by staff. Water Supply Section Chiefs and Program Managers make the final recommendation to adopt a policy to the Water Supply Division Director. Policies become finalized upon signature of the Division Director. Adopted policies may be subsequently considered for incorporation into a future revision of the Guidelines and/or regulations.

C. STANDARD OPERATING PROCEDURES (SOPs)

Standard Operating Procedures (SOPs) have been developed for certain activities within the Water Quality Assurance (WQA) Program. These SOPs have been categorized and catalogued in Program Guides ("Red Books") for reference. Program Guides are also used to initiate new staff to WQA programs. All DWS offices (4 regions and Boston) are equipped with a full set of Program Guides.

D. SECTION CHIEF'S MEETINGS

Monthly water supply section chiefs meetings provide a forum for discussion of general as well as regionally specific water supply issues. Certain issues may lead to the development of new policies or SOPs, which require approval of the Section Chiefs before being presented to the Division Director for ultimate approval.

E. TECHNICAL SUBCOMMITTEES

Technical subcommittees are formed in response to a need to resolve complicated and potentially complicated issues which relate to a particular program or program component. A subcommittee is chaired by a program coordinator from the Boston Office and comprised of a representative from each regional office. The members of a particular subcommittee will research and discuss matters of sufficient complexity and/or controversy that they might require a policy or standard operating procedure. The subcommittee chairperson compiles the minutes of each meeting and prepares proposed resolutions for consideration by water supply staff by way of the Section Chiefs.

F. MONTHLY REPORTS

Monthly reports, compiled by WQA, regularly provide a record of regional activity with respect to enforcement and sanitary surveys. The reports provide the reviewer with a sense of regional priorities.

G. CORRESPONDENCE

The DWS-Boston Office is sent copies all regional water supply correspondence. This provides Boston with the opportunity to review all regional letters for consistency. If an inconsistency is observed, it is generally brought to the attention of the regional Section Chief by way of phone call, e-mail or an item of discussion at the monthly Section Chiefs meeting.



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 92-07
Date: 04 Jan 93

DWS Policy 92-07

Bulk Water Suppliers Sampling Requirements and Transport responsibility

This policy is adopted to clarify the status of Bulk Water Suppliers.

Rationale: Bulk water source/supplies in Massachusetts are currently not regulated by Department of Public Health (DPH). These source/supplies can and may sell to public water systems e.g. Water vending operations or public water systems during emergencies. In addition, DEP was requested by DPH to ensure that these sources/supplies meet drinking water standards if they were to be sold to bottling facilities.

POLICY

It is the policy of the Division to require approval of bulk water supply sources which are intended to supply drinking water to public water systems on an emergency basis, to bottled water operations or vending systems.

I. If the Bulk water is to be provided to a public water system on an emergency basis as defined by 310 CMR 22.00 and DWS policies, DEP will also approve the transportation in accordance with DPH regulations, 105 CMR 570.003, Bulk storage and Transportation of Water. The requirements are:

(A) All source water storage facilities shall be maintained clean and sanitary at all times.

(B) Bulk tanks, hoses, pumps and connections used for loading, transporting and unloading water shall be sanitized prior to receiving each load of water.

(C) All surfaces that come into contact with water during transport shall be made of a smooth, impervious, nonabsorbent, corrosion-resistant and nontoxic material such as stainless

steel in compliance with American National Standard Institute/American Water Works Association specifications D100, D102, and D105, or an equally corrosion-resistant, nontoxic material.

(D) Transport tanks, filling and delivery hoses and connections shall be cleaned and sanitized each time they are emptied. A record of all cleaning and sanitizing showing the date, time, place and signature and name of the employee or contract operator doing the work, shall be maintained with the vehicle and shall be made available when requested by the Department.


(E) Equipment used for transport of water in bulk shall not be used for protein or fat-containing beverages or food products nor for any non-food products.

II. If the Bulk water is to be provided to a water bottling plant or other operations under the jurisdiction of DPH, DEP responsibilities stop at the source approval step (similar to Bottled Water Policy 88-18).

III. Routine monitoring for Bulk water supply sources will be equivalent to those required for a community public water system serving 10,000 or more people (similar to Bottled Water Policy 88-18).

IV. A water vending unit that supplies water to other water vending units in another location is also considered a bulk water supplier.

Approved: 31 August 1993
Effective: 31 August 1993


David Y. Terry, Director
Division of Water Supply



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 93-01

Date: 03/18/93

DWS Policy 93-01

Requirement for Disinfection with Water Supply Treatment

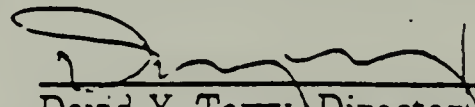
This policy is adopted to provide guidance on the requirement of disinfection with treatment added by public water suppliers.

POLICY

It is the Department's policy that all treatment including granular activated carbon, aeration, filtration and any other treatment as specified must have disinfection added after treatment and prior to the first customer. The Department will allow prechlorination at a location prior to treatment with the condition that a residual is maintained across treatment and a minimum residual of 0.2 mg/l is available at the entry point to the distribution system. Also, an opportunity for post chlorination must be available after the treatment system. The request for predisinfection with the ability to add post disinfection if necessary must be included in plans submitted to the Department for approval for this consideration to be made.

Approved: May 18, 1993

Effective: May 18, 1993



David Y. Terry, Director
Division of Water Supply

DB/ecw

b:ewhite/p-9301.wp



Commonwealth of Massachusetts
Executive Office of Environmental Affairs

Department of Environmental Protection

C-3

William F. Weld
Governor

Daniel S. Greenbaum
Commissioner

DWS Policy 93-02
Date: 8 August 93

DWS Policy 93-02

OPERATION AND MAINTENANCE MANUALS

Purpose

This policy and accompanying checklist has been adopted to provide general guidance for the development of operations and maintenance manuals for new or rehabilitated water treatment facilities.

General:

The operations and maintenance manual are the documents that describe the general mechanical operation and chemical functions of a water treatment facility, along with providing the necessary manufacturer materials for maintenance and repair of equipment.

Operations

The operations manual can be used as the study guide for personnel during training sessions, conducted by the consultant. The manual will provide specific instructions to the daily testing and operation of the facility and day to day tasks, which must be accomplished to meet the design objectives.

Operations manuals will contain the following information:

Table of Contents

1. Introduction to water system, source watersheds and facilities(s)
2. Water Quality standards
3. Responsibilities of operations and supervision personnel
4. Description of facility operations and hydraulics
5. Description of facility equipment and relationships
6. Instrumentation and computer console and system functions
7. Common operating problems and solutions
8. Chemical applications and AWWA standards for purity

9. Facility start-up and operation
10. Laboratory testing and operator responsibility
11. Sludge handling and discharge limits
12. Emergency power conditions, sequencing and general operation
13. Shut-down
14. Records and daily logs to be completed
15. OSHA safety requirements and facility safety
16. Calculations for chemical usages and dosages
17. EPA and DEP water quality, testing and permit reporting requirements

List of Figures

1. Schematic diagrams of flow within the facility
2. Line drawings of equipment and process components
3. Chemical applications

Appendices

- A. Design Criteria
- B. Board of Certification of Drinking Water Operator Regulations
- C. Definitions
- D. Required permits and requirements
- E. Required facility operations, laboratory, and maintenance forms

1. Introduction to Water System

The service area will be defined, including descriptions and locations of sources, booster pumping stations, varying pressure zones and storage facilities utilized by the system. This section will include general descriptions of the various facility types, hydraulic, level and flow conditions.

2. Water Quality Standards

The Safe Drinking Water Act and existing Department of Environmental Protection standards requirements for drinking water will be explained. Facility raw water quality and finished water standards removal efficiencies and discharge concentration parameters will be provided.

3. Responsibility of Operations and Supervisor Personnel

The roles of operations and the system's management personnel will be defined. Manpower requirements for each operator shift will be provided, along with general staffing plans for maintenance, operations and supervision. Operator certification and water system grade classification will be described along with written qualifications and responsibilities for each operator position.

4. Description of Facility Operation and Hydraulics

A description of the treatment process "walk through" will be provided for the various facility operations. A flow diagram will illustrate the treatment process. The description will outline the flow patterns, describe other units relationships and contain supplemental information as required.

5. Description of Facility Equipment

The manual section complete with appropriate subsections will provide description of the principal of operation for each facility component, and their interrelationships with one another. Supplemental schematic diagrams and drawings will be provided detailing electrical and instrumentation components.

6. Instrumentation and Computer Console

This section will provide a description of the water works system and related instrumentation. System configuration will be detailed to provide a general overall understanding of the electronic instrumentation and computer functions. Computer operations, controls and bypass procedures will be thoroughly examined.

7. Common Operation Problems

For each mechanical and chemical process, this operations manual subsection will analyze common operation problems in detail and provide solutions.

8. Chemical Applications

Each chemical utilized in the water works system will be provided with product handling and safety data to allow the operator to become familiar with each chemical utilized at the facility. The chemicals general purpose, effects, and safety issues will be discussed in detail. American Water Works Association (AWWA) standards for each chemicals will be provided to allow quality control to be performed. This will ensure that limitations outlined in the AWWA standards are being met.

9. Facility Start-up

The manual will clearly outline the start-up process, typical methods of operation, electrical selection components and special monitoring required by the operator of specific unit processes and mechanical equipment operations. Tables will be provided outlining each step in the start-up process.

10. Laboratory Testing

The operator will be provided with a list of required laboratory tests and an explanation of the rational and acceptable ranges for performing each test. This section will detail various chemical reactions and in analyzing problems at each interval of the treatment process. A program for sampling locations and relationship to one another will be provided. The laboratory will be provided with tests explaining chemical and bacteriological testing and interpretations of results. A discussion of the purpose of laboratory records will be provided. Potential certification by DEP for bacteriological or chemical testing will be discussed in detail.

11. Sludge Handling

This section will outline operational components of the sludge system including collection systems, sedimentation basins, filter backwash waste, lagoons, sewerlines along with start-up, typical operation and emergency measures.

Procedures and responsibilities for cleaning and disposal of accumulated and dried sludges will be provided.

12. Emergency Power

Power interruption and emergency power generator start-up and operation will be discussed, along with a vulnerability analysis of the system to natural disasters. Procedures for alerting the police and fire departments will be provided.

13. Shut-Down

Facility shut down procedures and processes for facility equipment will be discussed.

14. Record and Daily Logs

A discussion of the required plant records will be provided. The daily operation log, laboratory records, monthly reports to state agencies, annual reports, maintenance records and pumping reports will be provided in the Appendix. Personnel responsibilities for preparation of each record or form will be provided in a tabular format. Operational costs and labor records will be provided for completion by facility management.

15. OSHA and Facility Safety

Emergency procedures telephone numbers and a description of hazards will be examined, regarding employee responsibilities. A discussion of safety training and emergency procedures will include safety showers, fire extinguisher, air packs, safety glasses, etc will be provided. Pertinent sections of OSHA

standards for water treatment facilities will be included under this section.

16. Chemical Calculations

Examples of calculations for chemical treatment operations, costs and basic hydraulics will be provided.

17. Permits

A description of permits for sludge discharge, back flow preventors, cross-connection devices and others will be provided along with the operations or managements role and responsibility for each.

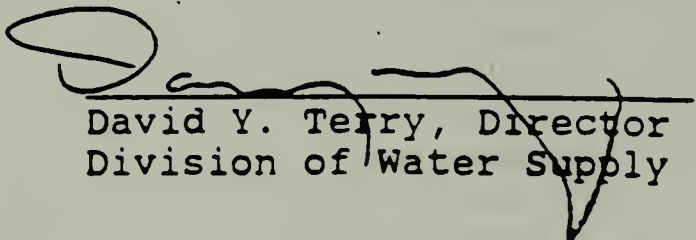
Maintenance Manual

Maintenance manuals will be provided in separate, 3-ring binders notebooks. Operations and maintenance data will be compiled and tabulated for all facility equipment.

The maintenance manuals will also include the following data, to be included in the manuals.

1. Shop Drawings
2. Microprocessor data entry forms
3. Record sheets with checklists will be provided, separated daily, weekly, monthly and quarterly for regular maintenance procedures to be utilized within the facility
4. Record forms will be provided to record daily hour used of equipment to determine proper greasing and oil charge periods.

Approved: 31 August 1993
Effective: 31 August 1993



David Y. Terry, Director
Division of Water Supply

DIVISION OF WATER SUPPLY

Operations and Maintenance Manuals
Check List

A.	<u>Operations Manual</u>	<u>Yes, No or NA</u>
1.	<u>Introduction to Water System</u>	
	a. Service area and storage	_____
	b. Sources described	_____
	c. Facility flow patterns with diagram	_____
2.	<u>Water Quality Standards</u>	
	a. Safe Drinking Water Act and Amendments	_____
	b. Recent Water Quality Standards	_____
	c. Facility Removal Parameters	_____
3.	<u>Responsibilities</u>	
	a. Operator	_____
	b. Management	_____
	c. Staffing Plans	_____
	d. Certification	_____
	e. Job Qualifications	_____
4.	<u>Facility Operation</u>	
	a. Description of Facility Operation	_____
	b. Flow Diagrams	_____
	c. Treatment Components Operation	_____
5.	<u>Facility Equipment</u>	
	a. Intake System	_____
	b. Raw Water Pumping	_____
	c. Aeration	_____
	d. Flash Mix	_____
	e. Flocculation	_____
	f. Sedimentation Basin	_____
	g. Sludge Pumps	_____
	h. Filtration System	_____
	i. Backwash	_____
	j. Sludge Lagoons / Discharge Piping	_____
	k. Disinfection	_____
	l. Valuing	_____
	m. Chemical Feed Pumps	_____
	n. Chemical Storage Tanks	_____
	o. Chemical Dry Feed Systems	_____

- p. Treated Water Pumps
- q. Surge Control Valves
- r. Air Compression
- s. Generator
- t. Motor Control Center

6. Instrumentation

- a. Water Works System
- b. Controls and Operations
- c. Computer Console
- d. Equipment Function;

7. Operation, Problems

- a. Mechanical
- b. Chemical
- c. Water works

8. Chemical Applications

- a. Handling
- b. Safety
- c. Purpose and Effects

9. Start-Up

- a. Start-Up Process
- b. Equipment operation
- c. Electrical System/Components

10. Laboratory

- a. Sampling Procedures
- b. Laboratory Equipment
- c. Bacteriological Testing
- d. Plant Testing Requirements
- e. SDWA-Testing Schedule
- f. Records

11. Sludge Handling

- a. Sludge Pump Operation
- b. Dewatering of Basins
- c. Sludge Lagoon Control
- d. Discharge Limits/Test
- e. Reports
- f. Emergency Measures

12. Emergency Power

- a. Generator Operation
- b. Transfer Switch
- c. Equipment Operation/Reset
- d. System Vulnerability
- e. Emergency Measures
- f. Emergency Conditions and Responses

13. Shut Down

- a. Shut Down Process
- b. Equipment Operation

14. Records

- a. Importance
- b. Process Operations
- c. Laboratory
- d. Maintenance
- e. Annual Reports
- f. Pumping
- g. Chemical

15. Safety

- a. OSHA Standards
- b. First Aid
- c. Chemical Spills
- d. Emergency Procedures
- e. Safety Equipment
- f. Chlorine Handling

16. Chemical Calculations

- a. Conversions
- b. Calculations
- c. Operational Costs
- d. Chemical Costs
- e. Hydraulics

17. Permits

- a. Required Permits
- b. Forms
- c. Description for Completion
- d. Reporting

18. Maintenance

- a. Requirements
- b. Manufacturers Requirements
- c. Schedule
- d. Special Tools and Equipment
- e. Housekeeping

19. Appendix

- a. Report Forms
- b. Maintenance Forms
- c. Laboratory Records
- d. Detailed Design Criteria
- e.

B. Maintenance Manual

- 1. Suppliers Manuals
- 2. Equipment Suppliers

checklist/per/nw

Water Treatment Facilities

CHECKLIST FOR PERMITS

- (1) Granted -Issued
- (2) Review Completed
- (3) Order of Conditions
- (4) Review Ongoing
- (5) Variance
- (6) Contractor Application

<u>Phase/Permit</u>	<u>Status as of</u>	<u>Comments</u>	<u>Approved</u>
<u>Construction</u> Army of Corps of Engineers Massachusetts Environmental Policy Act Conservation Application to Construct a septic tank (Board of Health) Zoning Board of Appeals DEP Water Quality Certification for (Re Ch. 91 application for intake construction) Town Special Permit for construction in Wetlands Historical Commission Building Permit		1	
<u>Operation</u> Groundwater Discharge Permit, DEP-Division of Water Pollution Control			

Wastewater Discharge or
NEDES Permit, DEP-Division
of Water Pollution Control

Municipal Water Purchase
Agreements

Air-Stripping
Installations Permit
DEP-Air Pollution Control

DPW-Highway Permit
(Assoc. Regional Systems)

MBTA

O&MPOL.FIN